

Remarks

This response was filed originally on October 26, 2005. Only Claim 1 was cancelled. No other amendments were made. The undersigned mistakenly omitted a complete listing of all of the claims. The listing is provided above. The remaining portions of this document are identical to that submitted on October 26, 2005, except that an additional Petition of Time section has been added. Further, I have not submitted an additional Terminal Disclaimer or Fee Transmittal, both of which were submitted on October 26, 2005. Copies of the Terminal Disclaimer and Fee Transmittal are submitted herewith.

Following the Preliminary Amendment, ten claims (1 and 14-22) remained in the application, of which two (1, 14) were independent. Claim 1 has been cancelled. No other amendments have been made to claims. Thus, nine claims remain (14-22).

The Office Action has rejected claims 1 and 3-22 under the judicially created doctrine of obviousness-type double patenting over claims 1-63 of parent U.S. Patent No. 6,719,948. Applicant respectfully points out that claims 3-13 of this application were cancelled in the Preliminary Amendment submitted upon filing of this case. Apparently a typographical or other error has arisen in the Office Action. Clarification is requested if the rejection is to be maintained. The applicant has assumed that the rejection meant to refer to claims 14-22.

Claims 14-22 are non-obvious over GB '041 alone, and in combination

The Office Action has rejected claims 14-19, 21 and 22 as being unpatentable under 35 U.S.C. 103(a) (non-

obviousness) over British patent, GB 613,041. The Office Action also rejects claim 20 as being unpatentable over GB 613,041 in further light of Banerjee.

Before discussing the rejection in detail, a brief review of the claims, taken largely from the Abstract, may be instructive. In infiltrating a porous metal skeleton, an infiltrant composition is used similar to that of the powder skeleton, but with the addition of a melting point depressant. The infiltrant quickly fills the skeleton. As the melting point depressant diffuses into the base powder, the liquid undergoes diffusional solidification and the material eventually homogenizes. Maintaining the infiltrant at a liquidus composition for the infiltration temperature typically ensures that the bulk composition or properties will remain uniform throughout the part, particularly in the direction of infiltration. It is also beneficial, in some cases, for the time scale of the infiltration to be much faster than the time scale of the diffusion of the melting point depressant and the subsequent solidification and homogenization. In particular, it is helpful to achieve uniform composition in the direction of infiltration if factors are chosen so that the relative ratios of components other than melting point depressant, in the liquid infiltrant not yet solidified, remain substantially constant.

Thus, it is understood, that for the limitations of the claims to be met, there must be some diffusional solidification that takes place. Solidification can not take place only by cooling.

The '041 patent describes using a similar alloy with a reduced melting temperature relative to a skeleton. In most, if not all instances, it explicitly contemplates cooling the infiltrated body to a temperature below the melting temperature of the infiltrant to freeze it. In

some instances, it mentions to cool the body to slightly below that melting point, thereby presumably freezing it, so that presumably solid state diffusion takes place to achieve a uniform concentration of the diffusing species within the regions that formerly were infiltrant, and skeleton. See p. 2, lines 70-83 (copper zinc system) and p. 3, l. 37-40 (solid state diffusion); and a ferrous system, p. 4, l. 26-36; p. 4, l. 77-90; line 110; p. 5, l. 121-127; The '041 patent never mentions solidification by diffusion. In fact, quite the converse takes place. The diffusion mentioned in the '041 patent all takes place after solidification.

The '041 patent does not discuss the problem of choke-off of infiltration from diffusional solidification, or achieving uniform composition along the direction of infiltration. The present claims under rejection each require (by virtue of claim 14, from which all depend):

the infiltrant having a composition that is a liquidus composition for an infiltration temperature, the liquidus composition and infiltration temperature chosen as set forth below regarding keeping the relative ratios relatively constant; and

subjecting the infiltrated skeleton to conditions such that a portion of said melting point depressant diffuses from the infiltrated porosities into the metal powder, and at least partial diffusional solidification occurs; and

choosing the metal powder composition, melting point depressant, infiltrant composition and infiltration temperature such that during diffusional solidification of the infiltrant, relative ratios, of components other than melting point depressant, in the liquid infiltrant not yet solidified, remain substantially constant.

Nothing in the British '041 patent mentions the underlined properties regarding, infiltrant composition and liquidus; partial diffusional solidification, and the constancy of the ratio of components of the infiltrant during diffusional solidification. These claimed features enable the uniform composition along the direction of infiltration. Thus, although the limitations may seem subtle, these limitations are significant. Reconsideration and withdrawal of the rejection in light of these remarks is respectfully requested.